

## Claims

1. An imaging system for determining the kinematics of an object, comprising:  
an ultrasonic trigger; and  
5 a camera operatively connected to the ultrasonic trigger to capture optical images of one or more objects.
2. The imaging device according to claim 1, wherein the object comprises at least one of a golf ball and a golf club.
- 10 3. The imaging device according to claim 1, wherein the ultrasonic trigger emits sound waves having a frequency between about 10 and about 500 KHz.
4. The imaging device according to claim 1, wherein the ultrasonic trigger emits sound  
15 waves having a frequency between about 100 and about 200 KHz.
5. The imaging device according to claim 1, wherein the ultrasonic trigger comprises an area of sonification having a diameter of between about 6 inches and about 2 feet.
- 20 6. The imaging device according to claim 1, wherein the ultrasonic trigger comprises a beam angle that is between about 1 and about 30 degrees.
7. The imaging device according to claim 1, wherein the ultrasonic trigger comprises a  
25 beam angle that is between about 5 and about 15 degrees.
8. The imaging device according to claim 1, wherein the ultrasonic trigger emits sound waves periodically.
9. The imaging device according to claim 8, wherein the periodic sound waves comprise  
30 pulses having a duration between about 10 and about 200 microseconds.

10. The imaging device according to claim 8, wherein the periodic sound waves comprise pulses, wherein the time period between the pulses is between about 100 and about 5000 microseconds.

5 11. The imaging device according to claim 8, wherein the periodic sound waves comprise pulses, wherein the time period between the pulses is greater than or equal to twice the distance from the ultrasonic trigger to a target area.

12. A system for simultaneously measuring golf club properties and golf ball properties  
10 during a golfer's striking of a golf ball, the system comprising:  
a first camera and a second camera, each of the first and second cameras  
focused toward a predetermined field of view;  
a golf club having at least one optical marker;  
a golf ball within the predetermined field of view; and  
15 an ultrasonic trigger disposed prior the golf ball along a path of a golf club  
swing, the ultrasonic trigger capable of estimating the golf club speed.

13. The system according to claim 12, wherein the ultrasonic trigger emits sound waves  
having a frequency between about 10 and about 500 KHz.

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14. The system according to claim 12, wherein the ultrasonic trigger comprises an area of sonification having a diameter of between about 6 inches and about 2 feet.

15. The system according to claim 12, wherein the ultrasonic trigger comprises a beam angle  
25 that is between about 1 and about 30 degrees.

16. The system according to claim 12, wherein the ultrasonic trigger emits sound waves periodically.

30 17. The system according to claim 16, wherein the periodic sound waves comprise pulses having a duration between about 10 and about 200 microseconds.

18. The system according to claim 16, wherein the periodic sound waves comprise pulses, wherein the time period between the pulses is between about 100 and about 5000 microseconds.

5 19. An ultrasonic triggering method, comprising:

emitting a plurality of ultrasonic sound waves towards a target area; and  
activating an imaging system to determine the kinematics of at least one  
object within the target area.

10 20. The method according to claim 19, wherein the frequency of the ultrasonic sound waves is between about 10 and about 500 KHz.

21. The method according to claim 19, wherein the ultrasonic sound waves are focused over an area of sonification having a diameter of between about six inches and about two feet.

15 22. The method according to claim 19, wherein the ultrasonic sound waves comprise periodic pulses having a duration of between about 10 and about 200 microseconds.

20 23. The method according to claim 19, wherein the ultrasonic sound waves comprise periodic pulses, wherein the duration between the pulses is between about 100 and about 5000 microseconds.

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